

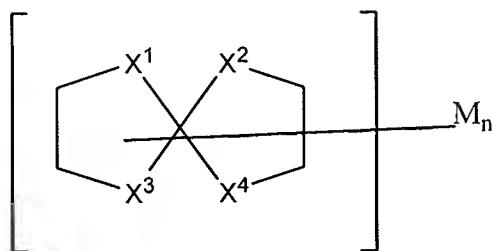
Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of the Claims:

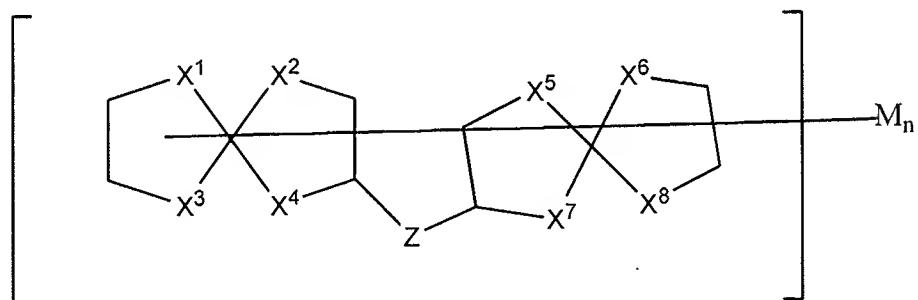
Claims 1-22 (cancelled).

23. (currently amended) A compound of Formula I :



Formula I

or Formula II:



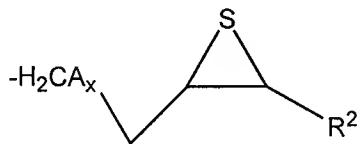
Formula II

wherein X^1 , X^2 , X^3 , X^4 , X^5 , X^6 , X^7 and X^8 are independently O or S; and in compound of formula I at least two and up to all four of X^1 , X^2 , X^3 and X^4 are sulfur;

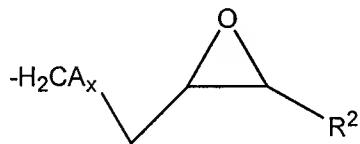
Z is $-C_mR^{2m}-$ wherein $m = 1$ to 4 ; $-C(R^2)_2SC(R^2)_2-$, $-C(R^2)_2SSC(R^2)_2-$, or $-C(R^2)_2OC(R^2)_2$;

n is 1 to 4 in compound of formula I and is 0 to 4 in compound of formula II n is from 0 to 4;

M is selected from CH_2Cl , $\text{CH}_2\text{SC(O)R}^1$, $\text{CH}_2\text{SC(S)R}^1$, $\text{CH}_2\text{S(CH}_2\text{CH}_2\text{S)}_q\text{H}$ wherein q is 0, 1 or 2; $-\text{CR}^2=\text{CH}_2$, $-\text{CH}_2\text{OC(O)CR}^2=\text{CH}_2$, $\text{CH}_2\text{N=C=S}$, $\text{CH}_2\text{N=C=O}$, $\text{CH}_2\text{NR}^2\text{H}$, CH_2OH , $\text{CH}_2\text{SCH}_2\text{CH}_2\text{CR}^2=\text{CH}_2$, phenyl, $\text{C(R}^2)_2$ phenyl, furan, thiophene, halogen, $\text{C}_3\text{-C}_6$ cycloalkyl, $\text{C}_3\text{-C}_6$ heterocyclics, thiol, [[H]]



or



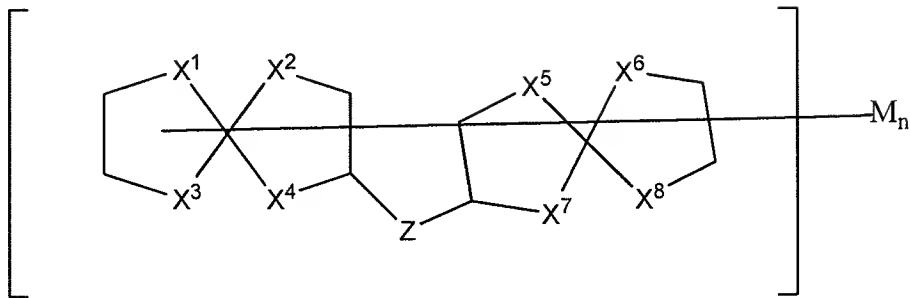
A is O, S or phenyl and x is 0 or 1;

wherein R^1 is $\text{C}_1\text{-C}_{22}$ alkyl; and

R^2 is H or $\text{C}_1\text{-C}_{22}$ alkyl,

~~Except that if the compound is STOC or SOTOC, at least one M substituent cannot be H and n must be 1, 2, 3 or 4.~~

24. (currently amended) The compound of claim 23, wherein in the compound of formula II at least two and up to all four of X^1 , X^2 , X^3 and X^4 , and at least two and up to all four of X^5 , X^6 , X^7 , and X^8 are sulfur.
25. (cancelled)
26. (previously presented) The compound of claim 23, further defined as having Formula II:



wherein n is 1, 2, 3 or 4.

27. (previously presented) The compound of claim 23, further defined as:

2-(Mercaptomethyl)-1,4,6,9-tetrathiaspiro[4.4]nonane;

2,7-Bis(mercaptomethyl)-1,4,6,9-tetrathiaspiro[4.4]nonane;

2-(S-methyl)-7-vinyl-1,4,6,9-tetrathiaspiro[4.4]nonane thiolacetate;

2-(Mercaptomethyl)-7-vinyl-1,4,6,9-tetrathiaspiro[4.4]nonane;

7-(Mercaptomethyl)-2-(S-methyl)-1,4,6,9-tetrathiaspiro[4.4]nonane thiolacetate;

2-Mercaptomethyl-1-oxa-4,6,9-trithiaspiro[4.4]nonane; or

2,7-Bis(mercaptomethyl)-1-oxa-4,6,9-trithiaspiro[4.4]nonane.

28. (currently amended) The compound of claim [[1]] 23, further defined as:

2-(Chloromethyl)-1,4,6,9-tetrathiaspiro[4.4]nonane;

2-(S-Methyl)-1,4,6,9-tetrathiaspiro[4.4]nonane thiolacetate;

4-(S-Methyl)-1,3-dithiolane-2-thione thiolacetate;

2-(Chloromethyl)-7-(S-methyl)-1,4,6,9-tetrathiaspiro[4.4]nonane thiolacetate;

2,7-Bis(S-methyl)-1,4,6,9-tetrathiaspiro[4.4]nonane thiolacetate;

2-(S-methyl)-1-oxa-4,6,9-trithiaspiro[4.4]nonane thiolacetate;

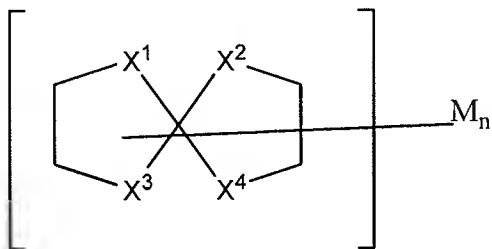
2-(Mercaptomethyl)-1-oxa-4,6,9-trithiaspiro[4.4]nonane;

2-(Chloromethyl)-7-(S-methyl)-1-oxa-4,6,9-trithiaspiro[4.4]nonane thiolacetate; or

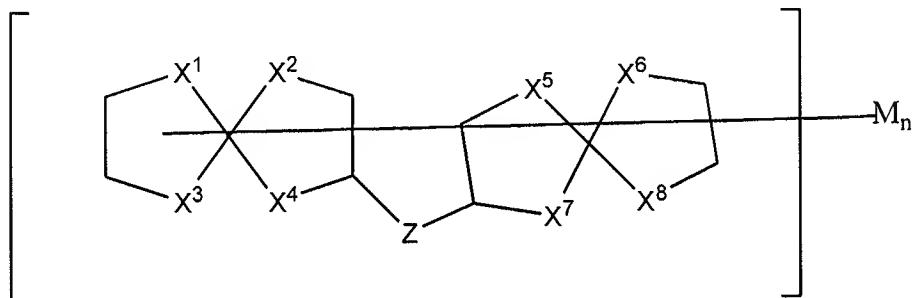
2,7-Bis(S-methyl)-1-oxa-4,6,9-trithiaspiro[4.4]nonane thiolacetate.

29. (currently amended) A method for manufacturing optical lenses comprising:

~~polymerizing at least one STOC or SOTOC a compound of Formula I:~~



~~or a bisSTOC or bisSOTOC compound of Formula II :~~



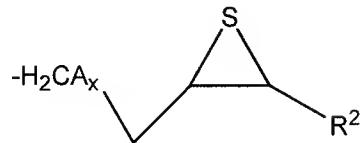
wherein X^1 , X^2 , X^3 , X^4 , X^5 , X^6 , X^7 , and X^8 , are independently O or S; and in compound of formula I at least two and up to all four X^1 , X^2 , X^3 and X^4 are sulfur;

Z is $-C_mR_{2m}^2-$ wherein m = 1-4; $-C(R^2)_2SC(R^2)_2-$, $-C(R^2)_2SSC(R^2)_2-$, or

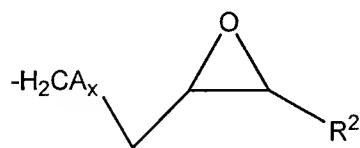
$-C(R^2)_2OC(R^2)_2$;

n is 1 to 4 in compound of formula I and is from 0 to 4 in compound of formula II n is from 0 to 4, except that if the compound is a STOC or SOTOC, n must be 1, 2, 3, or 4; and

M is selected from CH_2Cl , $CH_2SC(O)R^1$, $CH_2SC(S)R^1$, $CH_2S(CH_2CH_2S)qH$ wherein q is 0, 1 or 2 $[;]$, $-CR^2=CH_2$, $-CH_2OC(O)CR^2=CH_2$, $CH_2N=C=S$, $CH_2N=C=O$, CH_2NR^2H , CH_2OH , $CH_2SCH_2CH_2CR^2=CH_2$, phenyl, $C(R^2)_2$ phenyl, furan, thiophene, halogen, C_3-C_6 cycloalkyl, C_3-C_6 heretocyclics, thiol, H, except that if the compound is a STOC or SOTOC, at least one M moiety cannot be H;



or



wherein A is S, O or phenyl and x is 0 or 1;

R¹ is C₁-C₂₂ alkyl; and

R² is H or C₁-C₂₂ alkyl to form a polymer,

forming all or part of the optical lens.

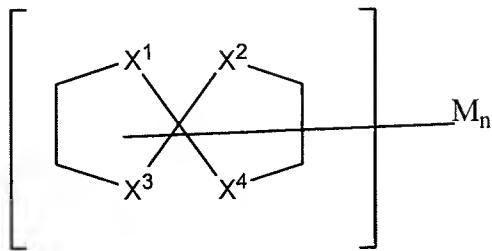
30. (currently amended) The method of claim 29, wherein in compound of formula II at least two and up to all four of X¹, X², X³ and X⁴ and at least two and up to all four of four of X⁵, X⁶, X⁷, and X⁸ are sulfur.

Claims 31-32 (cancelled)

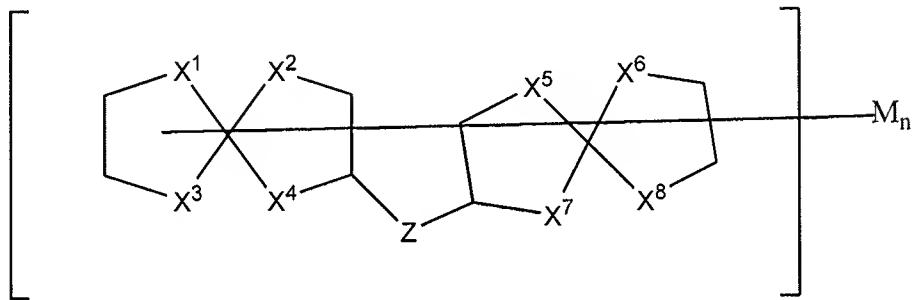
33. (currently amended) The method of claim [[31]] 29, wherein the polymer forms [[the]] a body of the lens.

34. (currently amended) The method of claim [[31]] 29, wherein the polymer forms a coating of the lens.

35. (currently amended) A (co)polymer comprising (co)polymerized monomers of Formula I:



or Formula II:



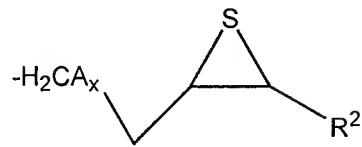
wherein X^1 , X^2 , X^3 , X^4 , X^5 , X^6 , X^7 , and X^8 , are independently O or S; and preferably and in compound of formula I at least two and up to all four X^1 , X^2 , X^3 and X^4 , and at least and up to all four of X^5 , X^6 , X^7 , and X^8 , are sulfur,

Z is $-C_mR^{2m}-$ wherein $m = 1-4$; $-C(R^2)_2SC(R^2)_2-$, $-C(R^2)_2SSC(R^2)_2-$, or

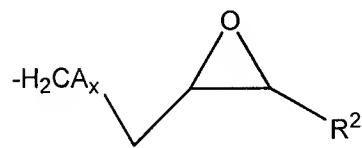
$-C(R^2)_2OC(R^2)_2$;

n is from 1 to 4 in compound of formula I and n is 0 to 4 in compound of formula II n is from 0 to 4, except that if the compound is a STOC or SOTOC, n must be 1, 2, 3 or 4; and

M is selected from CH_2Cl , $CH_2SC(O)R^1$, $CH_2SC(S)R^1$, $CH_2S(CH_2CH_2S)qH$ wherein q is 0, 1 or 2; $-CR^2=CH_2$, $-CH_2OC(O)CR^2=CH_2$, $CH_2N=C=S$, $CH_2N=C=O$, CH_2NR^2H , CH_2OH , $CH_2SCH_2CH_2CR^2=CH_2$, phenyl, $C(R^2)_2$ phenyl, furan, thiophene, halogen, C_3-C_6 cycloalkyl, C_3-C_6 heretocyclics, thiol, H, except that if the compound is a STOC or SOTOC, at least one M moiety cannot be H;



or



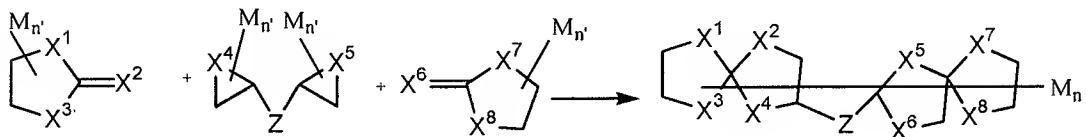
wherein A is S, O or phenyl and x is 0 or 1;

R^1 is C₁-C₂₂ alkyl; and

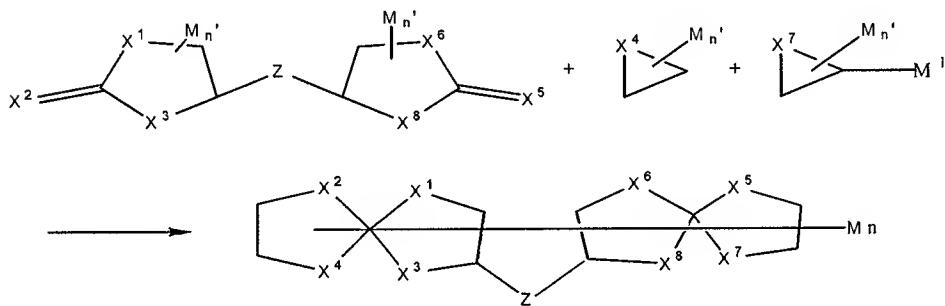
R^2 is H or C₁-C₂₂ alkyl ~~to form the polymer.~~

36. (currently amended) The (co)polymer of claim 35, wherein in compound of formula II at least two and up to all four of X¹, X², X³ and X⁴ and at least two and up to all four of X⁵, X⁶, X⁷ and X⁸ are sulfur.
37. (previously presented) The (co)polymer of claim 35, further defined as comprised in an optical lens.

38. (currently amended) A method for preparing a bisSTOC or bisSOTOC compound a bis-derivative of a spirotetrathiocarbonate or spirooxothiocarbonate, comprising using either one of the following reactions schemes :



or



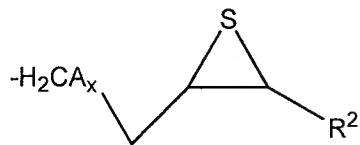
wherein $X^1, X^2, X^3, X^4, X^5, X^6, X^7$, and X^8 are independently O or S ; n' is independently

0, 1 or 2 ;

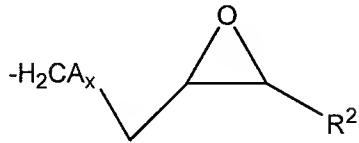
n is 0 to 4,

Z is $-C_mR^{2m}$ wherein m = 1-4; $-C(R^2)_2SC(R^2)_2$, $-C(R^2)_2SSC(R^2)_2$, $-C(R^2)_2OC(R^2)_2$;

M is independently selected from CH_2Cl , CH_2SH , $CH_2SC(O)R^1$, $CH_2SC(S)R^1$, $CH_2S(CH_2CH_2S)qH$ wherein q is 0, 1 or 2, $-CR^2=CH_2$, $-CH_2OC(O)CR^2=CH_2$, $CH_2N=C=S$, $CH_2N=C=O$, CH_2NR^2H , CH_2OH , $CH_2SCH_2CH_2CR^2=CH_2$, phenyl, $C(R^2)_2$ phenyl, furan, thiophene, halogen, C_3-C_6 cycloalkyl, C_3-C_6 heretocyclics, thiol, [[H]]



or

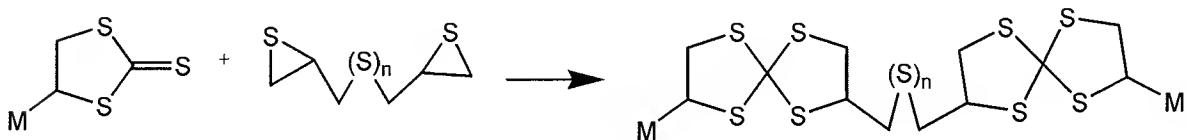


wherein A is S, O or phenyl and x is 0 or 1;

R^1 is C₁-C₂₂ alkyl; and

R^2 is H or C₁-C₂₂ alkyl.

39. (previously presented) The method of claim 38, comprising reacting a substituted ethylenetrithiocarbonate with a bis-methylthiirane sulfide or a bis-methylthiirane disulfide, in the presence of a catalytic amount of tetrafluoroboric acid to produce the bisSTOC as shown in the reaction below:



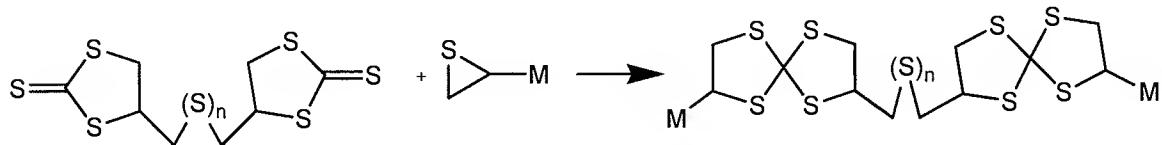
wherein M is selected from CR₂SR', CR₂=CH₂,

R = H, C₁-C₄ alkyl; and

R' = H, acetyl, allyl, acrylate, or methacrylate and

n = 1 or 2.

40. (previously presented) The method of claim 38, comprising reacting a bis-ethylenetrithiocarbonate sulfide or a bis-ethylenetrithiocarbonate, with substituted thiirane in the presence of a catalytic amount of tetrafluoroboric acid to produce the bisSTOC according to the following reaction:



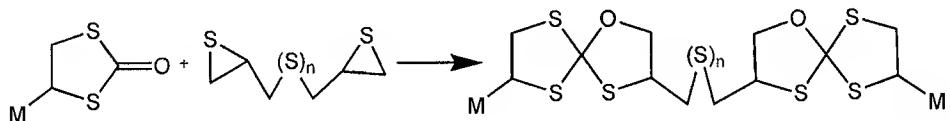
wherein M is CR₂Cl, CR₂SR', or CR₂=CH₂;

R is H, C₁-C₄ alkyl,

R' is H, allyl, acrylate, or methacrylate and

n = 1 or 2.

41. (previously presented) The method of claim 38, comprising reacting a substituted ethylenedithiocarbonate with bis-methylthiirane sulfide or bis-methylthiirane disulfide in the presence of a catalytic amount of tetrafluoroboric acid to produce the compound of formula II according to the reaction:



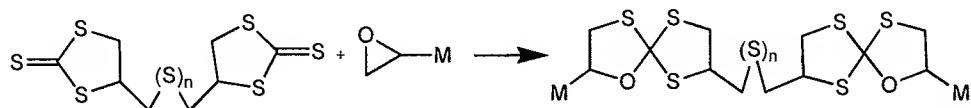
wherein M = CR₂SR', CR₂=CH₂;

R = H, C₁-C₄ alkyl[[,]]; and

R' = H, acetyl, allyl, acrylate, or methacrylate[[,]]; and

n = 1 or 2.

42. (previously presented) The method of claim 38, further defined as a method wherein at least one of bis-ethylenetrithiocarbonate sulfide or bis-ethylenetrithiocarbonate is reacted with a substituted oxirane, in the presence of a catalytic amount of tetrafluoroboric acid to produce the compound of formula II according to the reaction:



wherein M = CR₂Cl, CR₂OR' or CR₂=CH₂;

R = H, C₁-C₄ alkyl;

R' = H, allyl, acrylate or methacrylate; and

n = 1 or 2.

43. (currently amended) A method of preparing a polythiourethane polymer having a refractive index of 1.5 or greater, comprising reacting at least one polyisocyanate or prepolymer thereof with a ~~SOTC, SOTOC, bisSTOC or bis-SOTOC~~ compound having ~~at least one SH-bearing substituent(s) as set forth in claim 1, or a mixture thereof formula I or II in claim 23 or a mixture thereof, wherein said compound is further defined as having at least one SH bearing substituent.~~

44. (previously presented) The method of claim 43, wherein the at least one polyisocyanate or prepolymer thereof is a diisocyanate or prepolymer thereof.

45. (currently amended) The method of claim 43, wherein the ~~SOTC, SOTOC, bisSTOC or bis-SOTOC~~ compound of formula I or formula II has at least two SH bearing substituents.

46. (previously presented) The method of claim 43, further defined as comprising:
preparing a mixture of m-xylylene diisocyanate (m-XDI) and 2,7 bis(mercaptomethyl)-1,4,6,9-tetrathiaspiro[4.4]nonane;

adding a catalyst solution comprising KSCN and a crown-ether; and
curing the mixture at a temperature above 20°C.

47. (previously presented) The method of claim 43, further defined as comprising:

Dissolving SnBu₂Cl₂ in m-xylene diisocyanate (m-XDI);

adding 2,7-bis(mercaptomethyl)-1,4,6,9-tetrathiaspiro[4.4]nonane;

stirring; and

curing at a temperature above 30°C.
48. (currently amended) A method of preparing a polymer having a high refractive index which comprises reacting a monomer having at least one unsaturated reactive group or a mixture thereof and/or one or more polyepisulfides with a ~~STOC, SOTOC, bisSTOC or bis-SOTOC compound having at least one SH bearing substituent(s) as set forth in claim 1, or a mixture thereof compound of formula I or formula II of claim 23 having at least one SH bearing substituent(s) or a mixture thereof.~~
49. (currently amended) The method of claim 48, wherein the ~~STOC, SOTOC, bisSTOC or bis-SOTOC compound of formula I or formula II~~ has at least two SH bearing substituents.
50. (currently amended) A method of preparing a polymer having a high refractive index which comprises reacting a monomer having at least one SH group or a mixture thereof and/or one or more polyepisulfides with a ~~STOC, SOTOC, bisSTOC or bis-SOTOC compound having at least one, preferably two episulfide bearing substituent(s) as set forth in claim 1, or a mixture thereof compound of formula I or of formula II of claim 23 having at least one, preferably two episulfide bearing substituent(s) or a mixture thereof.~~
51. (previously presented) The method of claim 50, wherein the monomer has at least two SH groups.